

TECHNICAL INFORMATION

ALKALINE MANGANESE BATTERY

LR20 UniversalPower

FDK CORPORATION

ALKALINE BATTERY DIVISION

QUALITY ASSURANCE DEPARTMENT



1. Type

LR20 UniversalPower (IEC : LR20, JIS : LR20)

2. Nominal value

(1)Nominal voltage : 1.5 volts

(2)Standard capacity : 15,000 mAh (20Ω continuously discharge at 20°C,
End point voltage = 0.9 volts)

3. Structure

Show Fig.1.

4. Dimension

Show Fig.2.

5. Electric characteristics

	Initial	After 1 year	After 7 years
Off-load voltage (V)	1.60	1.58	1.53
On-load voltage (V)	1.56	1.51	1.44
Short-circuit current (A)	13.0	11.0	8.7

1) Load resistance : 5Ω(The resistance shall be adjusted within±0.05%),

Measure time : 0.3 seconds

2) Test temperature : 20±2°C, Storage temperature : 20±2°C.

6. Service out-put

(1) Average duration

Discharge condition		Initial	After 1 years	After 7 years
600mA 2hr/D (hr) EPV=0.9V	Normal	16	15	13
	JIS/IEC(MAD)	11	9.9	9.9
2.2Ω 1hr/D (hr) EPV=0.8V	Normal	23	22	20
	JIS/IEC(MAD)	16	14	14
2.2Ω 4mON/11mOFF Repeat. × 8hr/D (m) EPV=0.9V	Normal	1229	1204	1137
	JIS/IEC(MAD)	750	675	675

1) EPV : End point voltage

2) Test temperature : 20±2°C, Storage temperature : 20±2°C.

3)MAD=Minimum average duration.

(Minimum average time on discharge which is met by a sample of batteries)

*This data are not intended to make or imply any guarantee or warranty.

7. Electrolyte leakage proof characteristics

(1) Over-discharge test

Visual check at the time when the on-load voltage of test cell first decreases below 40% of the nominal voltage.

Discharge condition	n	Leakage
600mA 2hr/D	n=8×5lots	0
2.2Ω 1hr/D	n=8×5lots	0
2.2Ω4mON/11mOFFRepeat. × 8hr/D	n=8×5lots	0

(2) Storage at 45°C, below 70%RH

Period	n	10days	20days	30days	60days	90days
Leakage	40	none	none	none	none	none

(3) Storage at 60°C, 90%RH

Period	n	10days	20days	30days	40days
Leakage	40	none	none	none	none

8. Safety characteristics (abuse test)

(1) Short circuit test

Shorted time	n	12hours	24hours
Explosion	5	none	none

(2) Incorrect installation (four batteries in series)

Charging time	n	12hours	24hours
Explosion	10	none	none

9. Operating temperature range

-10°C~50°C(In the state of over 40°C, within 30 day)

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Fig.1 LR20 STRUCTURE

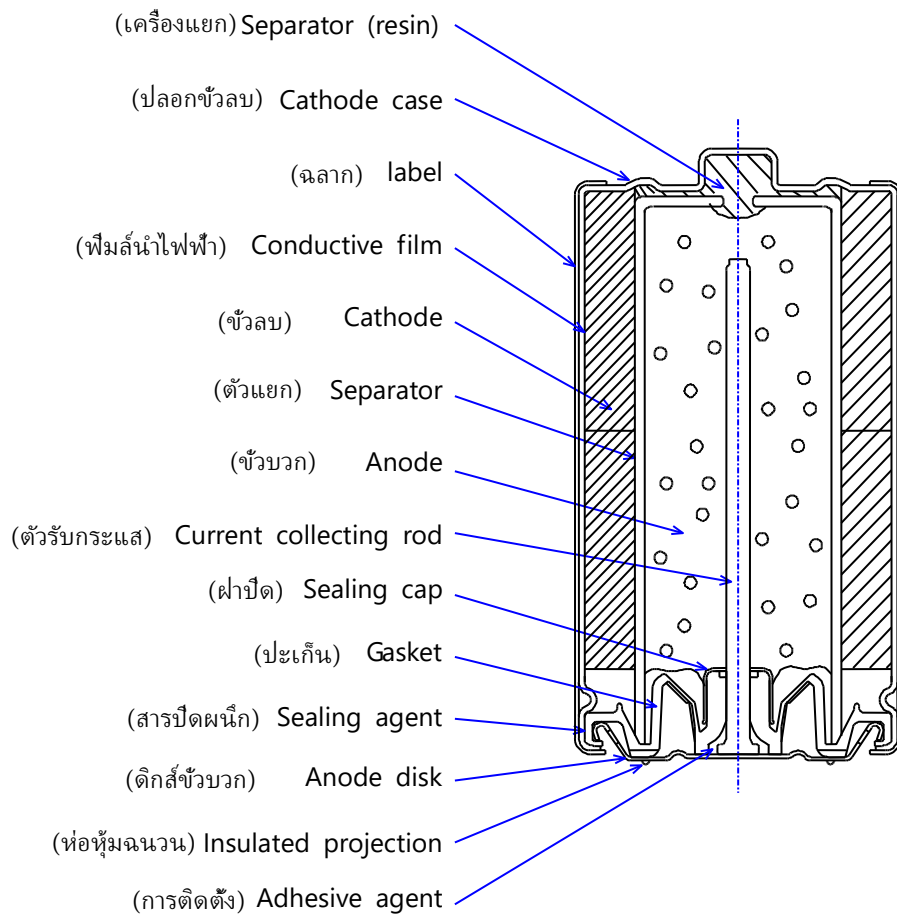
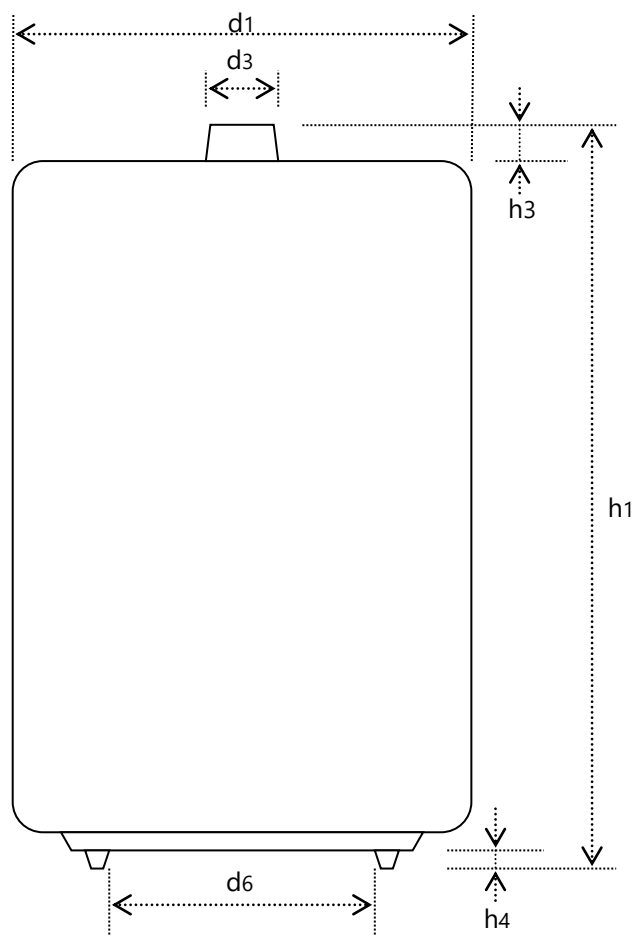


Fig.2 LR20 DIMENSION

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Unit : mm

h1	Overall height	61.5 max. (59.5 min.)
d6	Outer diameter of the negative contact area	18.0 min.
h4	Recess of negative contact	1.0 max.
d3	Diameter of the positive contact	9.5 max. (7.8 min.)
h3	Height of the projected flat contact from the next higher part	1.5 min.
d1	Diameter	34.2 max. 32.3 min.

The numerical values in parentheses are informative reference values.